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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/877,801  | 06/06/2001  | Andrew S. Keys       | MFS-31565-1         | 1358             |
| 30698   | 7590        | 12/31/2003           | EXAMINER            |                  |
| NASA/MARSHALL SPACE FLIGHT CENTER<br>LSO1/OFFICE OF CHIEF COUNSEL<br>MSFC, AL 35812 |             |                      | MOONEY, MICHAEL P   |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2877                |                  |

DATE MAILED: 12/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |
|------------------------------|------------------------|---------------------|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|                              | 09/877,801             | KEYS ET AL.         |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |
|                              | Michael P. Mooney      | 2877                |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 1-3,7,8,11-14 and 16-18 is/are rejected.
- 7) Claim(s) 4-6,9,10 and 15 is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) All    b) Some \* c) None of:  
1. Certified copies of the priority documents have been received.  
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

|  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                              | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                     | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ . | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 18 recites the limitation "optical switch according to claim 1" in line 1. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1-3, 7-8, 11-13, 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Gorfinkel et al. (5321253).**

Gorfinkel et al. teaches an optical phase modulator comprising: a multilayer stack, comprising a plurality of dielectric layers and having a transmission function related to at least one optical property of the stack, for receiving an optical input signal to be phase modulated; and phase modulator means for producing a nonmechanical

change in the at least one optical property of the stack to provide shifting of the transmission function to produce phase modulation of the optical input signal and to thereby produce a phase modulated output signal. (Abstract; figs. 1, 2, 4; col. 3 lines 45-50; col. 4 line 28 to col. 5 line 50; col. 8 lines 29-47).

Thus claim 1 is met.

Gorfinkel et al. teaches a phase modulator according to claim 1 wherein said multilayer stack comprises a bandpass multilayer stack. (Abstract; figs. 1, 2, 4; col. 3 lines 45-50; col. 4 line 28 to col. 5 line 50; col. 8 lines 29-47). Thus claim 2 is met.

Gorfinkel et al. teaches a phase modulator according to claim 1 wherein said at least optical property is refractive index, said dielectric layers each have a refractive index value, and said phase modulator means causes a variation in the refractive index of said dielectric layers such as to produce the shift in the transmission function. (Abstract; figs. 1, 2, 4; col. 3 lines 45-50; col. 4 line 28 to col. 5 line 50; col. 8 lines 29-47). Thus claim 3 is met.

Gorfinkel et al. teaches a phase modulator according to claim 1 wherein said dielectric layers comprise both layers having a high index of refraction and layers having a low index of refraction. (Abstract; figs. 1, 2, 4; col. 3 lines 45-50; col. 4 line 28 to col. 5 line 50; col. 8 lines 29-47). Thus claim 7 is met.

Gorfinkel et al. teaches a phase modulator according to claim 1 wherein said dielectric layers include alternating GaAs and AlAs layers. (Abstract; figs. 1, 2, 4; col. 3 lines 45-50; col. 4 line 28 to col. 5 line 50; col. 8 lines 29-47). Thus claim 8 is met.

Gorfinkel et al. teaches a phase modulator according to claim 1 wherein said modulation means comprises means for optically generating free carriers to provide phase modulation of the optical input signal. (Abstract; figs. 1, 2, 4; col. 3 lines 45-50; col. 4 line 28 to col. 5 line 50; col. 8 lines 29-47). Thus claim 11 is met.

Gorfinkel et al. teaches a phase modulator according to claim 3 wherein said modulation means comprises means for optically generating free carriers to provide phase modulation of the optical input signal. (Abstract; figs. 1, 2, 4; col. 3 lines 45-50; col. 4 line 28 to col. 5 line 50; col. 8 lines 29-47). Thus claim 12 is met.

Gorfinkel et al. teaches a phase modulator according to claim 1 wherein said modulation means comprises means for externally injecting free carriers to provide phase modulation of the optical input signal. (Abstract; figs. 1, 2, 4; col. 3 lines 45-50; col. 4 line 28 to col. 5 line 50; col. 8 lines 29-47). Thus claim 13 is met.

Gorfinkel et al. teaches a phase modulator according to claim 1 wherein said dielectric layers include GaAs layers, wherein at least one quantum well is created within each GaAs layer and said modulation means comprises means for applying an electric field to the layers of said stack. (Abstract; figs. 1, 2, 4; col. 3 lines 45-50; col. 4 line 28 to col. 5 line 50; col. 8 lines 29-47). Thus claim 16 is met.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**Claims 14, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorfinkel et al. (5321253).**

Although Gorfinkel et al. does not explicitly state “free carrier injection means for adjusting free carrier flow through the stack so as to vary the refractive index of the layers” it would have been obvious to do so because it is notoriously well known that devices such as Gorfinkel et al.’s have free carrier injection means for adjusting free carrier flow through the stack so as to vary the refractive index of the layers.

Thus claim 14 is rejected.

Although Gorfinkel et al. does not explicitly state “a plurality of dielectric layers and having a transmission function related to at least one optical property of the stack, for receiving an optical input signal to be phase modulated; and optical switching means for producing a nonmechanical change in at least one optical property of the stack to provide shifting of the transmission function to a region of high reflectivity” it would have been obvious to do so because it is notoriously well known that devices such as

Gorfinkel et al.'s have a plurality of dielectric layers and having a transmission function related to at least one optical property of the stack, for receiving an optical input signal to be phase modulated; and optical switching means for producing a nonmechanical change in at least one optical property of the stack to provide shifting of the transmission function to a region of high reflectivity. Thus claim 17 is rejected.

***Allowable Subject Matter***

Claims 4-6, 9-10, 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Mooney whose telephone number is 703-308-6125. The examiner can normally be reached during weekdays, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 703-308-4881. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7721 for After Final communications.

Art Unit: 2877

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956. An alternative useful number for status inquiries is 703-306-3329.

  
Michael P. Mooney  
Examiner  
Art Unit 2877

  
Frank G. Font  
Supervisory Patent Examiner  
Art Unit 2877

FGF/mpm  
12/29/03